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ABSTRACT

Questions frequently arise about the origins of outcome-based education and mastery learning, their similarities and differences, their theoretical and practical links, and evidence about their effects on student learning. Historical and theoretical perspectives show a clear distinction between outcome-based education and mastery learning. Outcome-based education is principally a curriculum reform model with definite implications for the assessment of student learning. Mastery learning, while known by various names and in various forms, is principally an instructional strategy labeled by B. S. Bloom, and designed to help teachers enhance the quality of their teaching procedures so that more of their students learn excellently. Outcome-based education and mastery learning address different educational concerns, but their potential if used in combination is clear. The combination of a thoughtful curriculum and effective instructional practices makes true improvement in learning possible. One figure illustrates the discussion. (Contains 27 references.) (SLD)

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OUTCOME-BASED EDUCATION AND MASTERY LEARNING:

CLARIFYING THE DIFFERENCES

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OUTCOME-BASED EDUCATION AND MASTERY LEARNING:

CLARIFYING THE DIFFERENCES

Outcome-based education is one of the most significant reform initiatives sweeping the country today. The ideas of outcome-based education are featured prominently in the statewide restructuring efforts of Kentucky, Michigan, Minnesota, Missouri, New York, Pennsylvania, and Texas, to name but a few. The premise of outcome-based education is that if educational programs are to be planned and continued improvements made, there must be a clear formulation of the goals being sought. And regardless of the way schools are formed or reformed, structured or re-structured, it is imperative that these goals center on student outcomes.

With the growing popularity of outcome-based education has come a great deal of confusion, however, especially regarding the relationship between outcome-based education and mastery learning (O'Neil, 1993; Towers, 1992). Questions frequently arise about the origin of each, their similarities and differences, their theoretical or practical linkages, and research evidence regarding their effects on student learning.

The purpose of this article is to clarify these issues and, hopefully, to resolve the confusion. It begins with a explanation of the theoretical premises of outcome-based education and mastery learning. The development of each is then traced historically, showing how they are linked both

conceptually and philosophically. Finally, the implications of their implementation for educational improvement are discussed.

Outcome-Based Education

Although some suggest that outcome-based education came into being only 10 or 15 years ago (Brandt, 1992), its guiding principles all were elegantly set forth in the 1940's by Ralph W. Tyler in his classic book, *Basic Principles of Curriculum and Instruction*. Tyler emphasized that four fundamental questions must be answered in developing any curriculum and plan of instruction. They are: (1) What educational purposes should the school seek to attain? (2) What educational experiences can be provided that are likely to accomplish these purposes? (3) How can these educational experiences be effectively organized? (4) How can we determine whether these purposes are being attained? (Tyler, 1949, p. 1).

In his writings, Tyler considered the specification of educational purposes to be synonymous with the process of defining "educational objectives." To Tyler, objectives were broadly defined as conceptions of what we want students to learn and what they should be able to do as a result of learning. In other words, objectives were the building blocks of curriculum and the focus of the first of his four fundamental questions. Tyler recognized, however, that "in the final analysis, objectives are matters of choice and they must, therefore, be considered value judgments of those responsible for the school" (Tyler, 1949, p. 4).

In the 1960's and early 1970's, Tyler's notions of "educational objectives" became associated with behavioral approaches to instruction. In general, these approaches were referred to as *objective-based education* (Baker, 1970), and were popularized because of the "back to basics" movement that dominated American education at the time. Under objective-based approaches, complex learning tasks were broken down into smaller, more basic skills which then were arranged in an appropriate "scope and sequence" for students to learn (Quilling & Otto, 1971; Rude, 1974).

The seemingly mechanistic and reductionist nature of behavioral approaches soon fell out of favor among mainstream educators, however, and attention turned to defining "educational competencies" and *competency-based education* (Spady, 1978; Spady & Mitchell, 1977). Competencies were defined as "indicators of successful performance in life-role activities" (Spady, 1977, p. 10), and were popular among curriculum development specialists during the mid 1970's. Although Tyler undoubtedly would have considered competencies to be one type of objective, the term was more palatable to educators concerned with the perceived rigidness objective-based approaches.

With advent of competency testing and other forms of criterion-referenced measurement in the latter 1970's, the attention of many educators turned to establishing "minimum or essential competencies." These were curriculum standards required of *all* students and were designed to address public

demand for accountability in education. But the focus on "minimum competencies" left other educators worried that the higher level capabilities of students would be neglected in curriculum planning.

In searching for a label for these significant, higher level capabilities, a variety of options was considered. Researchers at the Northwest Regional Educational Laboratory advocated *goal-based education* (Blum, 1981; Blum & Butler, 1981) to focus the attention of educators on more advanced learning. Goals were considered to be broader in context and more cognitively complex than more narrowly defined "objectives" or "competencies." But, unfortunately, the term "goals" suffered from the same linkages to behavioral approaches as did "objectives."

Another group loosely linked to the American Association of School Administrators came upon the word "outcomes." Benjamin Bloom had first used the word "outcomes" as a subheading in his original description of the mastery learning process (Bloom, 1968, p. 10). To Bloom, "outcomes" were the desired results from any teaching and learning process. They were the purposes a school sought to attain, as Tyler stated in the first of his four fundamental questions. And because the label "outcomes" was untainted by previous use or misuse, it would not be interpreted with the same narrowness that had come to be associated with "objectives," "competencies," and "goals." Hence was born in the late 1970's and early 1980's the label *outcome-based education* (Mitchell & Spady, 1978).

Like objectives, competencies, and goals, outcomes also were defined differently by different authors. The more simple definitions focus exclusively with curriculum and Tyler's first fundamental question, "What educational purposes should the school seek to attain?". Boysen (1992), for example, defines an outcome as "what students are expected to demonstrate" (p.10). Others offer more detailed definitions that also hint at Tyler's fourth fundamental question dealing with assessment; that is, "How can we determine whether these purposes are being attained?" Spady (1992), for example, defines an outcome as "a culminating demonstration of the entire range of learning experiences and capabilities that underlie it in a performance context that directly influences what and how it is carried out" (p. 7). From these various definitions it is clear, however, that outcome-based education focuses primarily on curriculum and, to a lesser extent, on assessment -- that is, Tyler's first and fourth fundamental questions. Tyler's second and third questions concerning instruction generally are not addressed in reference to outcome-based education.

Mastery Learning

Although there are various forms of mastery learning today, most can be traced the pioneering work of Benjamin S. Bloom in the late 1960's (Note 1). Bloom, a former student of Tyler, recognized the importance of the curriculum issues in Tyler's first fundamental question and the assessment issues in Tyler's fourth. His earlier work in developing the Taxonomies

of Educational Objectives (Bloom, et al. 1956; Krathwohl, et al. 1964) brought increased clarity and precision to educators' efforts in addressing these curriculum and assessment issues. In developing mastery learning, however, Bloom focused his attention on the instructional issues involved in Tyler's second and third fundamental questions: "What educational experiences can be provided that are likely to accomplish these purposes?" and "How can these educational experiences be effectively organized?"

Bloom proposed mastery learning as a theory and philosophy about the teaching and learning process that was linked to a set of practical instructional strategies. These strategies were designed to give teachers the means to have more of their students learn effectively and excellently whatever was taught (Bloom, 1968).

Bloom's work on mastery learning stemmed from his research in the mid-1960's concerning individual differences (Bloom, 1964). He recognized that in school settings, individual differences among students present a tremendous challenge to teachers, even when students are grouped in grade levels by age. Bloom was convinced, however, that aspects of the teaching and learning process could be altered to better accommodate these individual differences so that more students learn excellently and, as a result, attain very high levels of achievement.

To determine how this might be practically achieved, Bloom first considered how teaching and learning take place in

typical group-based classroom settings. He observed that most teachers begin their teaching by dividing the material they want students to learn into smaller learning units. These units often are sequentially ordered and correspond, in most cases, to chapters in the textbook used in teaching. Following instruction on the unit, a quiz or test is administered to students covering the unit material. To the teacher, this test is an evaluation device, used to determine who has learned the material well and who has not. Then, based on the results from this test, students are sorted into categories and assigned grades. To students, however, this test signifies the end of instruction on the unit and the end of the time they need to spend working on the material. It also represents their one and only chance to demonstrate what they have learned. After the test is administered and scored, marks are recorded in the grade book, and instruction begins on the next unit where the process is repeated.

When teaching and learning proceed in this manner, only a small number of students usually learns well the material in the unit. In fact, Bloom found only about 20% of the students in the class generally learn excellently what the teacher set out to teach. Under these conditions, the distribution of achievement among students at the end of the instructional sequence looks much like a normal bell-shaped curve.

Seeking a strategy that would produce better results, Bloom drew upon two sources of information. The first was knowledge of the ideal teaching and learning situation where an

excellent tutor is paired with an individual student. In other words, Bloom tried to determine what critical elements of one-to-one tutoring might be transferred to group-based instructional settings. The second source from which he drew was descriptions of the learning strategies employed by academically successful students. Here Bloom sought to identify the activities of high achieving students in group-based learning environments that distinguish them from their less successful counterparts.

Bloom saw dividing the material to be learned into units and checking on students' learning with a test at the end of each unit as useful instructional techniques. He believed, however, that the tests used by most teachers did little more than show for whom the initial instruction was or was not appropriate. If, on the other hand, these checks on learning were accompanied by a *feedback and corrective* procedure, they could serve as valuable learning tools. That is, instead of using these checks solely as evaluation devices marking the end of each unit, Bloom recommended they be used to diagnose individual learning difficulties (feedback) and to prescribe specific remediation procedures (correctives).

This type of feedback and corrective procedure is precisely what takes place when an individual student works with an excellent tutor. If the student makes an error, the tutor first points out the error (feedback), and then follows up with further explanation and clarification (corrective). Similarly, academically successful students typically follow up

the mistakes they make on quizzes and tests, seeking further information and greater understanding so that their errors are not repeated.

With this in mind, Bloom outlined a specific instructional strategy to make use of this feedback and corrective procedure, labeling it "mastery learning" (Bloom, 1968). By this strategy, the concepts and material students are to learn first are organized into instructional units. For most teachers, a unit is composed of the concepts presented in about a week or two of instructional time. Following initial instruction on the unit, a quiz or assessment is administered to students. But instead of signifying the end of the unit, this assessment is used primarily to give students information, or feedback, on their learning. In fact, to emphasize its new purpose Bloom suggested it be called a *formative assessment*, meaning "to inform or provide information." A formative assessment identifies for students precisely what they have learned well to that point, and what they need to learn better.

Also included with the formative assessment are explicit suggestions to students as to what they might do to correct the learning errors identified on the assessment. Because these suggested corrective activities are specific to each item or set of prompts within the assessment, students need to work only on those concepts not yet mastered. In other words, the correctives are "individualized." They may point out additional sources of information on a particular topic, such as the page numbers in the course textbook or workbook where

the topic is discussed. They may identify alternative learning resources such as different textbooks, learning kits, alternative materials, or computerized instructional lessons. Or they may simply suggest sources of additional practice, such as study guides, independent or guided practice activities. With the feedback and corrective information gained from a formative assessment, each student has a detailed prescription of what more needs to be done to master the concepts or desired learning outcomes from the unit.

When students complete their corrective activities, usually after a class period or two, they are administered a second formative assessment. There are two major reasons for this second assessment. First, it is necessary to verify whether the correctives were successful in helping students overcome their individual learning difficulties. But second, and equally important, the second formative assessment offers students a second chance at success. Hence, it serves as a powerful motivational device (Guskey, 1985).

In most group-based applications of mastery learning, correctives are accompanied by *enrichment* or *extension* activities for students who attain mastery from the initial teaching. Enrichment activities provide these students with exciting opportunities to broaden and expand their learning. To be effective these enrichments must be both *rewarding* and *challenging*. As a rule they are related to the topic being studied, but need not be tied directly to the content of a particular unit. Therefore, enrichment offers an excellent

means of involving students in challenging, higher level activities such as those designed for the gifted and talented. This process is illustrated in Figure 1.

Insert Figure 1

Although essentially neutral with regard to what is taught, how it is taught, and how resultant learning is evaluated, mastery learning requires there be consistency and alignment among these instructional components (Guskey, 1987). For example, if students are expected to learn higher level skills, such as those involved in application or analysis, mastery learning stipulates that instructional activities be planned to give students opportunities to actively engage in those skills. It also requires that students be given specific feedback on their learning of those skills, coupled with directions on how to correct any learning errors. And finally, procedures for evaluating students' learning should be based on those skills as well.

Through this process of formative assessment, combined with the systematic correction of individual learning difficulties and enrichment to extend the learning of faster learners, Bloom believed all students could be provided with a more appropriate quality of instruction. And under these more favorable learning conditions, he believed nearly *all* could learn excellently and truly master the subject material (Bloom,

1971, 1976). As a result, the distribution of achievement among students would be highly skewed, with the vast majority of students clustered at the upper end of the learning scale. It is important to note that under mastery learning, grading standards are not changed in any way. The same standards used with the traditional methods are still employed. But under mastery learning conditions, Bloom believed 80% or more of the students in a class would reach the same high level of achievement that only about 20% do under more traditional approaches to instruction.

It is important to note, however, that in developing mastery learning, Bloom set aside curriculum issues. He acknowledged, of course, that curriculum is extremely important. He also strongly encouraged educators engaged in curriculum development to focus their attention on more complex, higher level learning skills. Even though these skills are harder to teach and more difficult to learn, Bloom emphasized they are retained much longer by students and are more useful in students' later lives (Bloom, 1978). Nevertheless, Bloom saw mastery learning to be neutral with regard to curriculum. He believed the instructional strategies of mastery learning would be useful to educators regardless of the curriculum decisions they made.

Educational Importance

Viewed from this historical and theoretical perspective, the distinction between outcome-based education and mastery

learning is clear. Although known by various names and in various forms, outcome-based education is principally a curriculum reform model with definite implications for the assessment of student learning. As such, it directs the attention of educators to the first and fourth of Ralph Tyler's fundamental questions: "What educational purposes should the school seek to attain?" and "How can we determine whether these purposes are being attained?" Mastery learning, on the other hand, also is known by various names and in various forms. It is, however, principally an instructional strategy designed to help teachers enhance the quality of their teaching procedures so that more of their students learn excellently. As such, it focuses on the second and third of Ralph Tyler's fundamental questions: "What educational experiences can be provided that are likely to accomplish these purposes?" and "How can these educational experiences be effectively organized?"

So while outcome-based education and mastery learning are conceptually and theoretically linked, they are clearly distinct. They focus on different educational issues and address different educational concerns. Equally clear, however, is their potential if used in combination. The finest list of outcomes in the world, even if accompanied by valid assessment tools, represents a wish list at best. It will have little impact on student learning in the absence of effective instructional practices (Guskey, 1994). At the same time, it is essential that highly effective instructional strategies be paired with a thoughtfully planned curriculum. Having students

learn well is of little value if what they are learning is trivial or unimportant. It is the combination of a thoughtful curriculum and effective instructional practices that makes true improvement in education possible. Hence, the combination of outcome-based education and mastery learning is likely to prove very powerful. Together they address all four of the fundamental educational questions set forth by Ralph Tyler nearly fifty years ago.

Hopefully this effort to clarify the distinction between outcome-based education and mastery learning will facilitate the work of researchers and practitioners alike. Ideally, it will serve to guide investigations into the effects of each and direct the activities of educators at all levels who have interest in their implementation.

Notes:

1 Bloom (1974) found evidence of the philosophical premises of mastery learning in the writings of such early educators as Comenius, Pestalozzi, and Herbart. In addition, he indicated that a similar instructional process had been outlined by Morrison (1926).

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The Mastery Learning Instructional Process